Medical Licensing

Medical Licensing References

- NUREG-1556, Vol. 20: Guidance About Administrative Licensing Procedures
- NUREG-1556, Vol. 9, Rev. 2: Program-Specific Guidance About Medical Use Licenses
- 10 CFR Part 30: Rules of General Applicability to Domestic Licensing of Byproduct Material
- 10 CFR Part 35: Medical Use of Byproduct Material
- 10 CFR Part 20: Standards for Protection Against Radiation

Medical Use of Byproduct Material

- 10 CFR Part 35 – "Medical Use of Byproduct Material" defines categories of medical use in Subparts D-H and K.
- Subpart D: "Unsealed Byproduct Material – Written Directive Not Required"
  - 35.100: Uptake, Dilution, and Excretion Studies. Administration of small (usually microcurie) quantities of byproduct material, generally by intravenous injection or oral administration. Example is I-131 uptake (oral ingestion of capsule ~10 μCi) to assess thyroid function.

Medical Use of Byproduct Material

- Subpart D, continued
  - 35.200: Imaging and Localization Studies. Administration of (usually) millicurie quantities of byproduct material, often by intravenous injection, but sometimes by other routes (such as orally for gastric emptying studies) to create images.

    Example is intravenous administration of ~20-25 millicuries of Tc-99m HDP, then delayed imaging of distribution of uptake in bone.

Medical Use of Byproduct Material

- Subpart E:"Unsealed Byproduct Material - Written Directive Required"
  - When is a written directive required?
  - 35.40(a) states that a written directive is needed for sodium iodide I-131 greater than 30 μCi, any therapeutic dosage of unsealed byproduct material, or any therapeutic dose of radiation from byproduct material [i.e, from sealed sources].

Medical Use of Byproduct Material

- Subpart E, continued
- 35.300 is defined under Subpart E, and now includes 4 subcategories:
  - a. Oral administration of sodium iodide [NaI] I-131 requiring a written directive in quantities ≤ 33 mCi [i.e., >30 μCi and ≤ 33 mCi]. Example: 2-5 mCi for whole body scan for thyroid carcinoma patient or 7-30 mCi for treatment of hyperthyroidism.
  - b. Oral administration of NaI I-131 in quantities >33 mCi. Example: 50-250 mCi [sometimes higher] for treatment of thyroid carcinoma.

Medical Use of Byproduct Material

c. Parenteral [i.e., not oral] administration of therapeutic dosages of any beta-emitter, or a photon-emitting radionuclide less than 150 keV. Examples: IV Sm-153 for bony metastases, IV I-131 MIBG for treatment of neuroblastoma.

   Includes any radionuclide with a beta emission.

Note: although IV administration of therapeutic I-131 MIBG falls under 35.300, diagnostic administration of IV MIBG falls under 35.200 and does not require a written directive.

Medical Use of Byproduct Material

d. Parenteral [i.e., not oral] administration of therapeutic dosages of any other radionuclide.

   Examples: none at present; may be used in future for alpha-emitters.

Medical Use of Byproduct Material

- Subpart F: "Manual Brachytherapy"
  - 35.400 is defined under Subpart F, and includes temporary and permanent sealed source implants.

    Examples: temporary intracavitary Cs-137 implants for gynecological cancers, temporary interstitial Ir-192 implants for head and neck cancers, permanent I-125 interstitial implants for prostate cancer.

Medical Use of Byproduct Material

- Subpart G: "Sealed Sources for Diagnosis"
  - 35.500 is defined under Subpart G, and includes sources used external to the patient to aid in diagnosis. Current examples are Gd-153 or Cs-137 attenuation correction sources used in SPECT or PET nuclear medicine imaging systems.

    Note: use of I-125 seeds for tumor localization/ excision, while diagnostic, is not considered under 35.500

Medical Use of Byproduct Material

- Subpart H: "Photon Emitting Remote Afterloader Units, Teletherapy Units, and Gamma Stereotactic Radiosurgery Units"
  - 35.600 is defined under Subpart H and includes sealed source treatment devices. Most common examples are high dose-rate remote afterloaders (HDR) and Co-60 gamma knife. Less common examples are low dose-rate remote afterloaders (LDR) and Co-60 teletherapy.

Medical Use of Byproduct Material

- Subpart K: "Other Medical Uses of Byproduct Material or Radiation from Byproduct Material"
  - 35.1000 is defined under Subpart K. 35.1000 is an approach for licensing of emerging medical technologies that do not fit into Subparts D-H. As technologies come into use, licensing guidance is developed and posted on the Medical Licensee Toolkit page of the NRC website:

http://www.nrc.gov/materials/miau/med-use-toolkit.html

Medical Use of Byproduct Material

- Subpart K, continued
  - "Licensing Guidance for 10 CFR 35.1000 sealed sources and devices" is on the webpage under "Other Guidance."

    Current active examples include Leksell Perfexion (new generation gamma knife) and I-125/Pa-103 seeds for localizing non-palpable lesions.

Medical Use of Byproduct Material

- Subpart K, continued
  - Other examples:
    - I-125 Iotrex in the GliaSite delivery system (brain tumors)
    - Y-90 microspheres (TheraSphere & SIRSphere) (liver tumors)
    - Intravascular Brachytherapy (IVB) (cardiac)

Medical Licensing Approach

Pre-October 2002:

- 10 CFR Part 35 regulations were prescriptive.
- Licensing application guidance = Reg. Guide 10.8.
- Required licensee to submit many detailed procedures (or to accept model procedures).
- License reviewer reviewed procedures for acceptability (unless licensee committed to follow model procedures).
- Changes in procedures required license amendments.

Medical Licensing Approach

Post-October 2002:

- 10 CFR Part 35 regulations are risk-informed/performance-based (except for prescriptive elements of newly-added 35.600).
- Licensing application guidance = NUREG-1556, Vol. 9.
- Requires submission of few procedures (only for 35.600); substitutes commitments to develop and implement procedures; some topics require no submission of information (e.g., sealed source inventory, leak tests).
- License reviewers have few procedures to review; performance/procedures evaluated during inspections.

NUREG-1556, Vol. 9

- "Consolidated Guidance About Materials Licenses, Program-Specific Guidance About Medical Use Licenses"
- Rev. 1 issued in May 2005
- Rev. 2 issued January 2008
- Provides guidance on 2 topics:
  - Preparation of a license application
  - NRC's criteria for evaluating a medical use license application
- Appendices I-W include model procedures, but intent is not for licensee to commit to follow these (unlike old Reg. Guide 10.8)

NUREG-1556, Vol. 9

- Section 8 describes in detail the contents of an application. Each session includes:
  - Regulations
  - Criteria
  - Discussion
  - Response to be provided by Applicant
- Appendix A=Form 313, the cover sheet/certification sheet for all materials license applications (not just medical).
- Appendix C is the license application checklist.

Appendix C

- **Appendix C:**
  - **Table C.1=Applicability Table. Maps out which items need to be completed for each category of requested authorization.**
  - **Tables C.2 and C.3 are checklists of the information to be provided for Items 5-11 on Form 313.**

NOTE: The numbering systems in Table C.1 and C.2/C.3 are different!!! C.1 corresponds to the numbering in Section 8 and C.2/C.3 correspond to the numbering in Form 313.

Appendix C

- Appendix C may be used by both the applicant and the license reviewer
- Applicant has the option to either submit a copy of Tables C.2 and C.3 (plus supporting information) or to provide the same information in the format of their choice.
- License reviewer uses Appendix C as a review checklist, referring back to the detailed instructions to applicant in Section 8.

Appendix C, Table C.2

- Table C.2 checklist (Items 5&6):
  - Applicant designates the requested radionuclides, forms, maximum quantities.
  - In accordance with 10 CFR 30.32(g), applicant must provide the manufacturer and model number for each requested sealed source and device. (Reviewer will confirm each is listed in SSDR for the requested use.)
  - Calibration, transmission, and reference sources meeting the requirements of 35.65 do not need to be listed, including certain sealed sources < 30 mCi.

Appendix C, Table C.3

- Item 7 = Training & Experience for Radiation Safety Officer (RSO), Authorized Users (AUs), Authorized Nuclear Pharmacists (ANPs), and Authorized Medical Physicists (AMPs).

  Requirements for each are delineated in the regulations. Regs are complex, and there are multiple alternative routes for each. **Subpart J references are outdated. Supporting info may be provided on Form 313A (or by another method that includes all required info).

Table C.3, Item 7

- Form 313A (Vol. 9, App. B) revised; Regulatory Issue Summary (RIS) 2006-027 issued on 12/13/06
- There are now 6 separate forms: RSO, ANP, AMP, AUD for 35.100/200/500, AUT for 35.300, and AUS for 35.400/600.
- RIS 2006-27, Supplement 1, issued 06/27/07 – revised 3 of the 6 forms further (AUD, AUT & AUS)
- The medical toolkit on the NRC webpage should be reviewed often

Table C.3, Item 7

- Confirming that proposed authorized individuals meet the requirements is often the most difficult aspect of medical licensing.

- Confirming that proposed authorized individuals meet the requirements is one of the most important, potentially safety significant aspects of medical licensing, particularly for AU and AMP therapy authorizations (35.300/400/600/1000).

Table C.3, Item 7

- RSO: 10 CFR 35.50
- AMP: 35.51
- ANP: 35.55
- Authorized Users:
  - 35.100: 35.190
  - 35.200: 35.290
  - 35.300: 35.390 or 35.392, 35.394, and 35.396
  - 35.400: 35.490 or 35.491
  - 35.500: 35.590
  - 35.600: 35.690

Table C.3, Item 7

- For all categories of authorized individuals, the following apply:
  - 35.57: “Experienced” authorized individuals, previously listed on a license need not comply with current training requirements in many cases.
  - 35.59: Recentness of training; all required T&E must have been obtained within 7 years, or document “related continuing education and experience.”
- Current listing for identical authorization on the same (if renewal) or another license always qualifies the individual.

Table C.3, Item 7

- Board certifications:
  - No longer listed in the regulations, but posted on the Medical Uses Licensee Toolkit webpage at: http://www.nrc.gov/materials/miau/med-use-toolkit/spec-board-cert.html
  - This is a "work-in-progress" and the board certifications of some proposed authorized individuals are not currently accepted.

Table C.3, Item 7

- Board certification, continued
  - Even with board certification, some additional requirements may apply (i.e., casework for 35.300 AU; training in device operation, clinical use, etc. for 35.600 AU and AMP).
  - All first-time authorizations require a preceptor attestation, even for individuals qualifying based on board certification. Preceptor must attest that individual completed the required training is competent to function independently.

Example, Proposed 35.200 AU

- On NRC or AS license as 35.200 AU (no preceptor attestation required), OR
- Certification by CBNC (not CCNC) if resident of US or ABNM, with certificate stating "United States" plus preceptor attestation, OR
- Current 35.300 AU with generator experience, OR
- Alternate pathway-35.290(c)(1) [classroom training and byproduct material work experience, including generator experience], plus preceptor attestation.
- If training and experience is more than 7 years old, document recent training/experience

Table C.3, Item 9 - Facility Diagram

- Must be adequate to protect health and minimize danger to life or property
  - Diagram-should include room(s) adjacent to where byproduct materials are prepared, used, administered , or stored; for 35.100 and 35.200 materials-Hot Lab, shielding; for 35.300 and 35.400-give generic description of rooms where patients are admitted; if permanently shielded areas (e.g. source storage)-type, placement of shielding and adjacent areas; for 35.600- provide all of the above and shielding calculations

Table C.3, Item 9 - Radiation Monitoring Instruments

All licensees shall possess calibrated radiation detection and measuring instruments that will be used for radiation protection, including survey and monitoring

- **Radiation Monitoring Instruments - describe instruments that will be used to perform required surveys. Be sure to include instrumentation used to evaluate removable contamination surveys.**
- **Calibration statement-performed by "qualified" person, AND/OR**
- **"We have developed, and will implement and maintain written survey meter calibration procedures…"**
- **APPENDIX K includes model procedure.**

Table C.3,Item 9 - Dose Calibrator and Other Dosage Measuring Equipment

10 CFR 35.60 and 35.63 describes requirements for the use, possession, calibration, and check of instruments (dose calibrators) used to measure patient dosages

- If using only unit dosages made by Part 32 supplier; no requirement to possess dose calibrator, may decay - correct.
- If licensee prepares, or manipulates dosages - required to possess and calibrate instruments used
- "Equipment used to measure dosages will be calibrated in accordance with nationally recognized standards or the manufacturer's instructions"

Table C.3, Item 9 - Therapy Unit Calibration and Use

- If applicable, licensee must provide procedures required by :
  - 35.642 - Periodic spot-checks for teletherapy
  - 35.643 - Periodic spot-checks for remote afterloaders
  - 35.645 - Periodic spot-checks for gamma knife
- NOTE: Licensee is not required to submit the corresponding full calibration procedures required by 35.632, 35.633, or 35.635.

Table C.3, Item 9 - Other Facilities and Equipment

- Manual brachytherapy: description of emergency response equipment
- 35.600 teletherapy, gamma knife and remote afterloader facilities:
  - Description of warning systems and restricted area controls (e.g., locks, signs, warning lights and alarms, interlock systems) for each treatment room
  - Area radiation monitoring equipment
  - Viewing and intercom systems (except for low dose rate remote afterloaders)

Table C.3, Item 9 - Other Facilities and Equipment

- 35.600 facilities, continued
  - Steps that will be taken to ensure that two radiation producing machines in the same room can't operate at same time
  - Methods to ensure that whenever the device is not in use or is unattended, the console keys will be inaccessible to unauthorized person
  - Description of emergency response equipment
  - Suggest also asking about unit and treatment room security, for compliance with 10 CFR 35.610(a)(1)

Table C.3, Item 10 - Safety Procedures and Instructions

Emergency Procedures for 35.600 uses - teletherapy, gamma knife, and remote afterloaders

- Submit written procedures required by 35.610 for responding to an abnormal situation, including:
  - Instructions for responding to equipment failures and names of individuals responsible
  - Process for restricting access to and posting of treatment area
  - Contact names and phone nos. of AU/AMP/RSO if unit or console operates abnormally

Table C.3, Item 10 - Occupational Dose

- "Either we will perform a prospective evaluation demonstrating that unmonitored individuals are not likely to receive, in 1 year, a radiation dose in excess of 10 % of the allowable limits in 10 CFR Part 20 or we will provide dosimetry that meets the requirements listed under "Criteria" in NUREG-1556, Vol. 9, Rev. 1."

  OR

- Describe an alternative method for demonstrating compliance with Part 20 requirements
- APPENDIX M includes model procedure - licensee may propose this as their alternative method

Table C.3, Item 10 - Area Surveys

- "We have developed and will implement and maintain written procedures for area surveys in accordance with 10 CFR 20.1101 that meet the requirements of 10 CFR 20.1501 and 10 CFR 35.70."
- APPENDIX R includes model procedure

Table C.3, Item 10 - Safe Use of Unsealed Licensed Material

- "We have developed and will implement and maintain procedures for safe use of unsealed byproduct material that meet the requirements of 10 CFR 20.1101 and 10 CFR 20.1301."
- APPENDIX T includes model procedure

Table C.3, Item 10 - Spill Procedures

- "We have developed and will implement and maintain written procedures for safe response to spills of licensed material in accordance with 10 CFR 20.1101."
- APPENDIX N includes, in part, model spill procedure

Table C.3, Item 10 - Installation, Maintenance, Adjustment, Repair and Inspection of Therapy Devices Containing Sealed Sources

- No response required if licensee contracts with vendor to provide personnel specifically licensed to perform 35.605 tasks
- For licensee staff to perform this work, provide:
  - Name of proposed individual
  - Activities requested
  - Description of the individual's training and experience for the requested activities
  - Copy of the individual's training certificate from the manufacturer and an outline of training

Table C.3, Item 10 - Minimization of Contamination

- A response is not required under the following condition: the NRC will consider that the criteria have been met if the information provided in applicant's responses satisfy the criteria in Sections 8.15, 8.16, 8.21, 8.25, 8.27, and 8.29 on the topics: Facility and Equipment; Facility Diagram; Radiation Protection Program; Safety Program; and Waste Management.

Table C.3, Item 11 - Waste Management

- "We have developed and will implement and maintain written waste disposal procedures for licensed material in accordance with 10 CFR 20.1101 that also meet the requirements of the applicable section of Subpart K to 10 CFR Part 20 and 35.92."
- APPENDIX W includes model procedure

Increased Controls

- Pertain to only certain medical programs, given the types and quantities of materials used
- Gamma Knife is typically the only program with greater than Category 2 quantities authorized
- HDR programs could be licensed for greater than Cat 2 quantities, but are not usually
- Any teletherapy units still licensed for medical use would also need ICs applied
- Blood irradiators are also greater than Cat 2, but are usually licensed separately and not as a medical license

THE END